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EXAMINER

AVELLINO, JOSEPH E

ART UNIT

PAPER NUMBER

2143

DATE MAILED: 04/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/872,329

Applicant(s)

BERG, MITCHELL T.

Examiner

Joseph E. Avellino

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-52 is/are rejected.
- 7) ☒ Claim(s) 43 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-52 are presented for examination with claims 1, 18, 42, 46, and 49 independent.

Claim Objections

2. Claim 43 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 43 recites a conditional for when a type of packet is received through the second network, however this feature is not required for the parent claim, since a client request packet is received through a first network, and can generate either the first type or the second type of packet. Correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 47-48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claims 47-48 recite the limitation "separate from the first local area network" which lacks antecedent basis. Correction is required. For examination purposes, the phrase will be interpreted as "separate from the global network".

Claim Rejections - 35 USC § 102

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 42, 43, and 45-49 are rejected under 35 U.S.C. 102(b) as being anticipated by Aversa et al. (Load Balancing a Cluster of Web Servers Technical Report BUCS-TR-1999-01, Boston University, Computer Science Department, January, 1999) (cited by Applicant in IDS) (hereinafter Aversa).

7. Referring to claim 42, Aversa discloses selectively load balance and direct network requests among a plurality of servers by:

maintaining a state table associated with a plurality of servers (p. 4, ¶ 2 "*To enable stateful routing...*"); and

when a client request packet is received through a first network, (i.e. Internet, Figure 2), selectively generating, based at least in part on the maintained state table, a first type of network packet for transmission to a client through the first network OR a second type of network packet (i.e. a FORWARD request packet) for transmission to another processor (i.e. server) residing in a different one of the plurality of server via a

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second network (i.e. LAN) that is different than the first network (p. 3, ¶ 2 *"To illustrate this packet rewriting scheme..."*).

8. Referring to claim 43, Aversa discloses when a network packet of the second packet type is received through the second network (i.e. LAN), selectively generating a third type of network packet (i.e. response to request) for transmission to the client through the first network (Figure 2, p. 3, ¶ 2 *"To illustrate this packet rewriting scheme..."*).

9. Referring to claim 45, Aversa discloses the second type of network packet contains an encapsulation header that identifies a connection to the client via a first network (i.e. serve request to Client using the IP address of original server as the source IP) (p. 3, ¶ 2 to p. 4, ¶ 3 *"To illustrate this packet rewriting scheme..."* to *"To enable a stateful routing of requests..."*).

10. Claims 46-49 are rejected for similar reasons as stated above. Furthermore Aversa migrates the connection to the first computer system (the Office takes the term "migrating the connection" to mean "servicing the connection") (p. 3, ¶ 2) and a connection of a synchronization network separate from the first global network (p. 4, ¶ 2-3).

Claim Rejections - 35 USC § 103

11. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-11, 13-16, 18-28, and 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aversa).

12. Referring to claim 1, Aversa discloses an information processing system, comprising:

a first computing device (in the example given in the reference it is referred to as "Server 4") (Figure 2) for:

receiving an initialization packet (i.e. SYN) originating from a client (p. 5, ¶ 2-3);

in response to at least the initialization packet, outputting a response packet (i.e. ACK) to the client (it is an inherent feature of the system that an ACK is sent to the client in order to tell the client that the connection is opened, this is one of the building blocks of the HTTP protocol);

receiving a request packet originating from the client (p. 4, ¶ 2); and

in response to at least the request packet and a state of at least one of the first computing device and a second computing device, selectively outputting the request packet to the second computing device for performing an operation through a

second network that is not the same as the first network (i.e. LAN versus Internet) transmit resource, Server 4 looks at its own load, and if it is above a threshold, it will examine the load of other servers, in the example, forwarding the connection to Server 2, which has a load below the threshold) (p. 4, ¶ 2).

Aversa does not specifically state receiving the initialization packet through a first port connected to a first network, and the client request is received through the first port and the output to the second network is connected to a second port. However, Aversa shows in Figure 2 a Local Network connecting Servers 1-5 and receiving a client request from Clients A-C routed through the Internet. Therefore one of ordinary skill in the art that there are two ports per server one connected (the Office takes the term “connected” as logically able to communicate via that port) to the first port (i.e. listening on the Internet) and another port connected to the Local Network (i.e. listening on the Local Network as shown by the “Forward” request to server 2 from server 4). Therefore, one of ordinary skill in the art would find it obvious to modify the teaching of Aversa to include a first port connected to a first network and a second port connected to a second network not the same as the first network, since it would reduce bottlenecking by not requiring one server to act as a router for all the other servers, effectively distributing the routing architecture over all of the servers as can be seen in Figures 1 and 2 of Aversa

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13. Referring to claim 2, Aversa discloses the first computing device is a NIC (this is an inherent feature of Aversa, since the Server would be unable to communicate with the network if a NIC was not installed on the Server).

14. Referring to claim 3, Aversa discloses the second computing device is configured to perform an operation of a software application (i.e. a web server) (p. 5, ¶ 3).

15. Referring to claim 4, Aversa discloses the software application is a socket based application (the Office takes the term "socket based application" as any application which either uses, controls, or interfaces with a socket, such as a web server) (p. 5, ¶ 3).

16. Referring to claim 5, Aversa discloses the initialization packet (i.e. SYN packet) is addressed by the client to the first computing device (i.e. Server 4), and wherein the first computing device is for receiving the initialization packet in response to the addressing (an inherent feature of HTTP is that a server always receives a packet to which it is addressed, barring any connection disruptions) (p. 4, ¶ 2).

17. Referring to claim 6, Aversa discloses outputting a response packet to the client and wherein the first computing device is for:

in response to at least the request packet and the state (i.e. server load),
selectively outputting the request packet to the second computing device for outputting

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the response packet to the client, such that the output response packet bypasses the first computing device (i.e. Server 2, responds by sending the requested resource to the client using Server 4 as the source address) (p. 4, ¶ 2; p. 5, ¶ 3).

18. Referring to claim 7, Aversa discloses the first computing device is for receiving the initialization packet through a global computer network (i.e. Internet) (e.g. abstract).

19. Referring to claim 8, Aversa discloses the first computing device is for selectively outputting the request packet to the second computing device through a LAN (Figure 2).

20. Referring to claim 9, Aversa discloses in response to the at least the initialization packet, establishing a data structure of a connection with a client (i.e. an IP-IP encapsulation packet) (p. 4, ¶ 1); and

In response to at least the request packet and the state, selectively outputting the data structure to the second computing device for associating an application of the second computing device with the data structure of the connection (p. 4, ¶ 1).

21. Referring to claim 10, Aversa discloses in response to at least the initialization packet, establishing a data structure (IP-IP encapsulation packet) of a connection with the client, the data structure including a group of sequence numbers associated with the connection (it is well known that HTTP IP packets have several octets reserved for a sequence number, in order to reassemble the packets at the destination).

22. Claims 11 and 13 are rejected for similar reasons as stated above. Furthermore Aversa discloses bypassing the first computing device and appearing to the client as received from the first communicating device (i.e. Server 2 serves the request to client B using the IP address of Server 4 as the source address) (p. 3, ¶ 3).

23. Referring to claims 12 and 29, Aversa discloses the invention substantively as described in claim 10. Aversa does not specifically state the group of sequence numbers includes at least one start sequence number, at least one current sequence number, and at least one ACK number. It is well known that HTTP provides for storing current sequence numbers and ACK numbers in order to determine which packets have been received and acknowledged to determine if the requested resource has been fully received. In regards to the start sequence number, it would make sense to track that number for encryption purposes (some encryption algorithms start their sequence numbers at random numbers to confuse any snooping algorithms which think they have missed the beginning part of the sequence). By this rationale it would have been obvious to one of ordinary skill in the art to track the start sequence number, the current sequence number, and the ACK number to keep track of all the packets incoming and outgoing from the computing device, thereby providing for a reliable transport protocol for web documents.

24. Referring to claims 14-16, Aversa discloses the address includes an IP address and a TCP port, (i.e. an IP address of the first computing device and port 80, which is the port of the TCP/IP stack) (p. 5, ¶ 7).

25. Referring to claims 17 and 34, Aversa discloses the invention substantively as described in claim 15. Aversa further discloses the port is a TCP port as seen in claim 16, however remains silent over if the port can be a UDP port. It is well known that web servers can exist using UDP ports, and some applications rely upon these ports (web conferencing, gameplay, blizzard.net, etc) in order to provide an almost real-time feel to the content. It would have been obvious to one of ordinary skill in the art to provide for a UDP port to communicate the first computing device to a second computing device in order to rely upon the UDP protocol for a server, thereby increasing the abilities of the web servers and allowing more users access to the network.

26. Claims 18-28, and 30-33 are rejected for similar reasons as stated above.

27. Referring to claim 39, Aversa discloses the invention substantively as described above. Aversa discloses a third network (i.e LAN) to transmit synchronization information and coupled to each of the plurality of servers, wherein the first server of the plurality of servers is configured to selective redistribute through the second network a received client request to a second server in the plurality of servers based at least in part of the transmitted synchronization information (see rejections above).

28. Referring to claim 40, Aversa inherently discloses a router for transmitting a response to a received client request and coupled (i.e. able to communicate) to the second server in the plurality of servers (Aversa discloses being coupled to the Internet which inherently has at least one router for facilitating responses to clients) (Figure 2).

29. Referring to claim 41, Aversa discloses the first network is coupled to each of the plurality of servers and each server can receive a client request (Figure 2, see multiple requests coming from Client A to Server 2, Client C to Server 5, etc.).

30. Referring to claim 44, Aversa discloses the invention substantively as described in claim 42. Aversa does not specifically state the third packet is transmitted when network packet of the second type is received (Aversa discloses the synchronization information is transmitted "intermittently"). However one of ordinary skill would realize the benefits of transmitting the synchronization information when a packet has been received to ensure the updating of the load information for that particular server occurs when it is needed (i.e. when a new request arrives) and is reduced for when it is not needed (i.e. when a request does not come in for a period of time), thereby reducing overall traffic load on the network as well as reducing overall overhead processing of packets in the network.

31. Referring to claim 50, Aversa discloses the invention substantively as described in claim 49. Aversa does not specifically state sending a response packet by the first computer system such that the client thinks it came from the second computer system, however Aversa also states that the IP source addresses can be modified to include other servers as sending the response (see rejections above), and it is inherent that TCP packets receive ACK packets for sent packets, so therefore one of ordinary skill in the art would realize the benefits of having the client perceiving the response packet is received from the second computer system in order to remove the first computer system from repeatedly having to forward requests to the second computer system, thereby reducing the load on the first computer system (i.e. Server 4 still receives requests for Client B even though the request is being served by Server 2, however Server 4 still has to process the packet, determine which server is handling this request, and then forward this packet, costing valuable processing time) (p. 3, ¶ 2).

Claims 51 and 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aversa in view of Joffe et al. (USPN 6,185,619) (hereinafter Joffe).

32. Referring to claim 51, Aversa discloses the invention substantively as described in claim 49. Aversa does not specifically disclose forwarding the packet to the first computer system without invoking services of the operating system. IN analogous art,

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Joffe discloses another information processing system which discloses disclose forwarding the packet to the first computer system without invoking services of the operating system (the selection is done by the Director daemon, not the Operating System of the server) (col. 11, lines 42-55). It would have been obvious to one of ordinary skill in the art to combine the teaching of Joffe with Aversa in order to select an appropriate server from which to retrieve a data object for a user based upon the user's request and the capabilities and topology of the underlying network as supported by Joffe (col. 3, lines 35-40).

33. Referring to claim 52, Aversa discloses the invention substantively as described in claim 49. Aversa does not specifically disclose not using IP-IP encapsulation and without using TCP splicing techniques in order to output the packet to the first computer system. IN analogous art, Joffe discloses another information processing system which discloses not using IP-IP encapsulation and without using TCP splicing techniques in order to output the packet to the first computer system (col. 12, lines 50-55). It would have been obvious to one of ordinary skill in the art to combine the teaching of Joffe with Aversa in order to select an appropriate server from which to retrieve a data object for a user based upon the user's request and the capabilities and topology of the underlying network as supported by Joffe (col. 3, lines 35-40).

Response to Arguments

34. Applicant's arguments with respect to claims 1-52 have been considered but are moot in view of the new ground(s) of rejection. Applicant has argued that Aversa does not disclose a first network and a second network, Applicant is requested to view the rejections above as to how Aversa would render this obvious to one of ordinary skill.

35. Applicant has traversed the Office's assertions that claims 12, 17, 29, and 34, are well known in the art.

36. With regards to claims 12, and 29, Applicant's attention is directed to RFC 793: (*Transmission Control Protocol*, September 1981 Information Sciences Institute). Applicant will find on Pages 21-27 the disclosure of at least one start sequence number (i.e. SEG.SEQ), one current sequence number (SND.NXT) and at least one ACK number (SEG.ACK). By this rationale, the rejection is maintained.

37. With regards to claims 17 and 34, Applicant's attention is directed to RFC 768: (*User Datagram Protocol*, August 1980, Postel, J.). Applicant will find on page 2 the format of a UDP packet, and find that the packet contains a source and destination address, which is consistent with an IP header, which is how the system of Aversa is used (p. 4, ¶ 2). By this rationale, the rejection is maintained.

Conclusion

38. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph E. Avellino whose telephone number is (571) 272-3905. The examiner can normally be reached on Monday-Friday 7:00-4:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David A. Wiley can be reached on (571) 272-3923. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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